Abstract Submitted
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Cavity-mediated effects in transport CLAUDIU GENES, Max Planck Institute for the Science of Light — Transport properties of materials (transport of charge, energy, correlations, etc) can be considerably altered in the presence of strong light-matter interactions manifested in the strong coupling regime of cavity quantum electrodynamics. Recent experiments show that enhanced charge transport in organic semiconductor materials can occur [3] that can be simulated via a two-band model where the inter-band transitions are coupled to the confined light modes of a micro-cavity and consequent delocalized hybrid light-matter states participate in the transport. In a simplified quantum optical model, where a single cavity light mode is equally coupled to a chain of two-level systems, we study the modification of the typical nearest neighbor hopping transport below and inside the strong coupling regime. We find in [1] (in agreement with [3]) that the polariton-enhanced transport can show polynomial instead of exponential suppression with the system size in the presence of disorder. [1] J. Schachenmayer, C. Genes, E. Tignone and G. Pupillo, Phys. Rev. Lett., 114, 196403 (2015). [2] J. Feist and F. J. Garcia-Vidal, Phys. Rev. Lett., 114, 196402 (2015). [3] E. Orgiu et al, Nat. Mat. 14, 1123, (2015).

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